

Vertical Compliance Trends in KBOS OPD Arrival Redesign

This report is a high-level summary of vertical compliance trends and overall rates of Area Navigation Optimized Profile Descent (RNAV OPD) utilization for Boston Logan International Airport. Specifically, we investigated trends from three RNAV OPDs and the subsequent redesigned iterations of those procedures: OOSHN3 to OOSHN4, ROBUC1 to ROBUC2, and QUABN3 to JFUND1.

Our method of investigating these trends in flying RNAV procedures is a function of mining historical radar track data, then mapping those returns to specific characteristics of the procedure (e.g., waypoint location, altitude restriction). This results in a waypoint-centered perspective of aircraft position and can be used to identify trends in operations that were not previously available at this scale. For example, if one wanted to know the distribution of altitudes flown at a specific waypoint with an altitude restriction, a histogram could be produced and analyzed displaying the altitudes of all the flights for a specific date range. In addition, this method can also be expanded to see how the aggregate performance of a complete transition, procedure, or city is compared with another.

Performance monitoring of procedures is not limited to real-time comparisons. Using specific dates and keeping records of procedural iterations, retrospective analyses are possible and can be used to compare the effects of procedural design changes intended to address specific problems. Additionally, performance can be monitored over time at regular intervals to determine if outside influences, other than design changes are affecting the compliance levels for a procedure.

Vertical Compliance Trends

To be included in the vertical compliance dataset, a flight must fly a complete transition route within 1 mile of each waypoint laterally (See Figure 1).

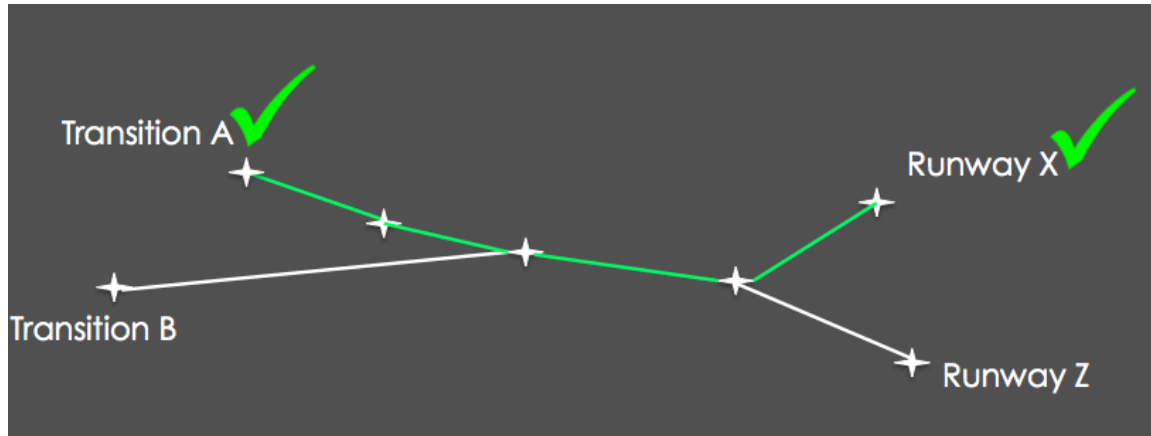
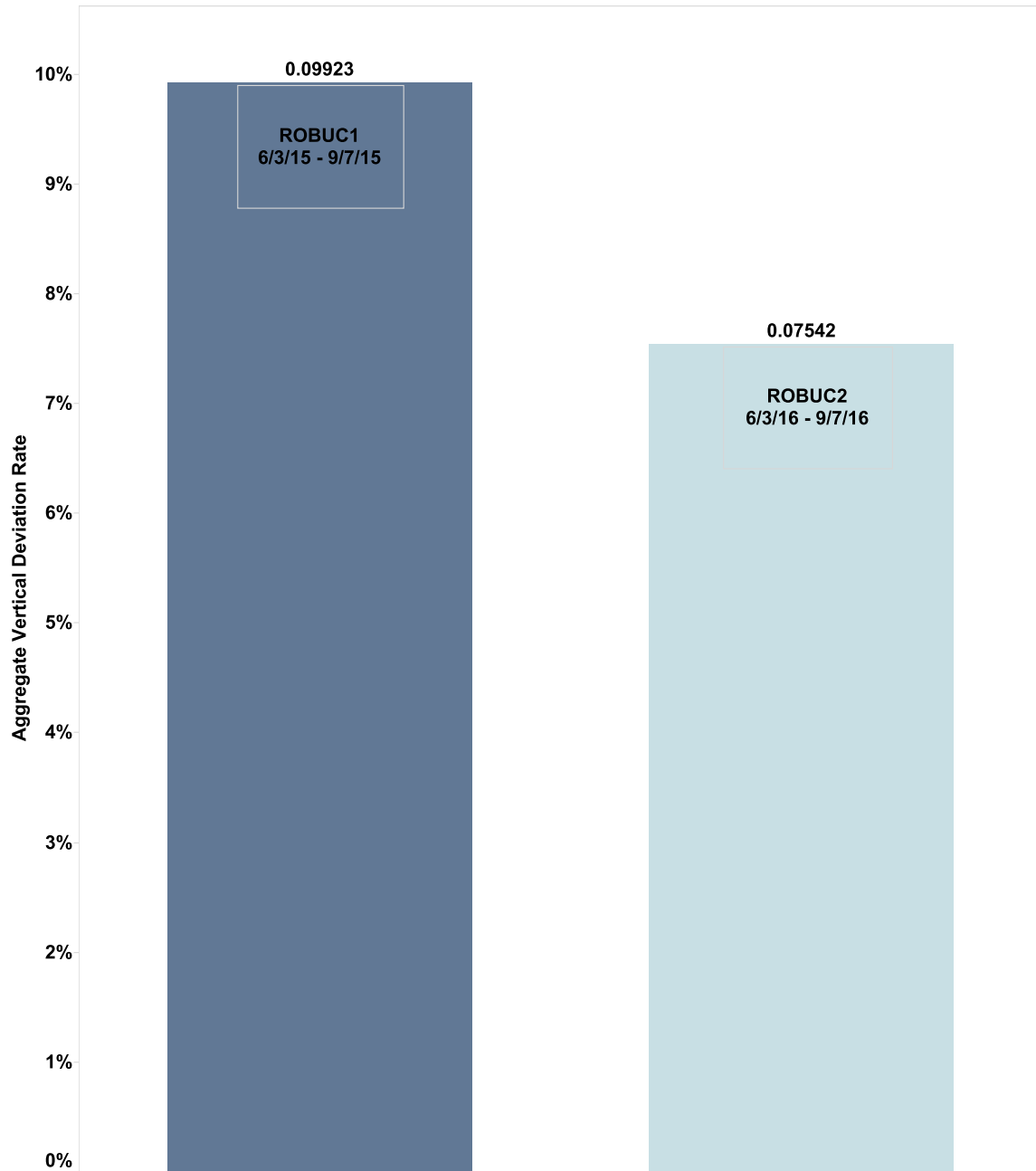


Figure 1. 100% Lateral Compliance Example

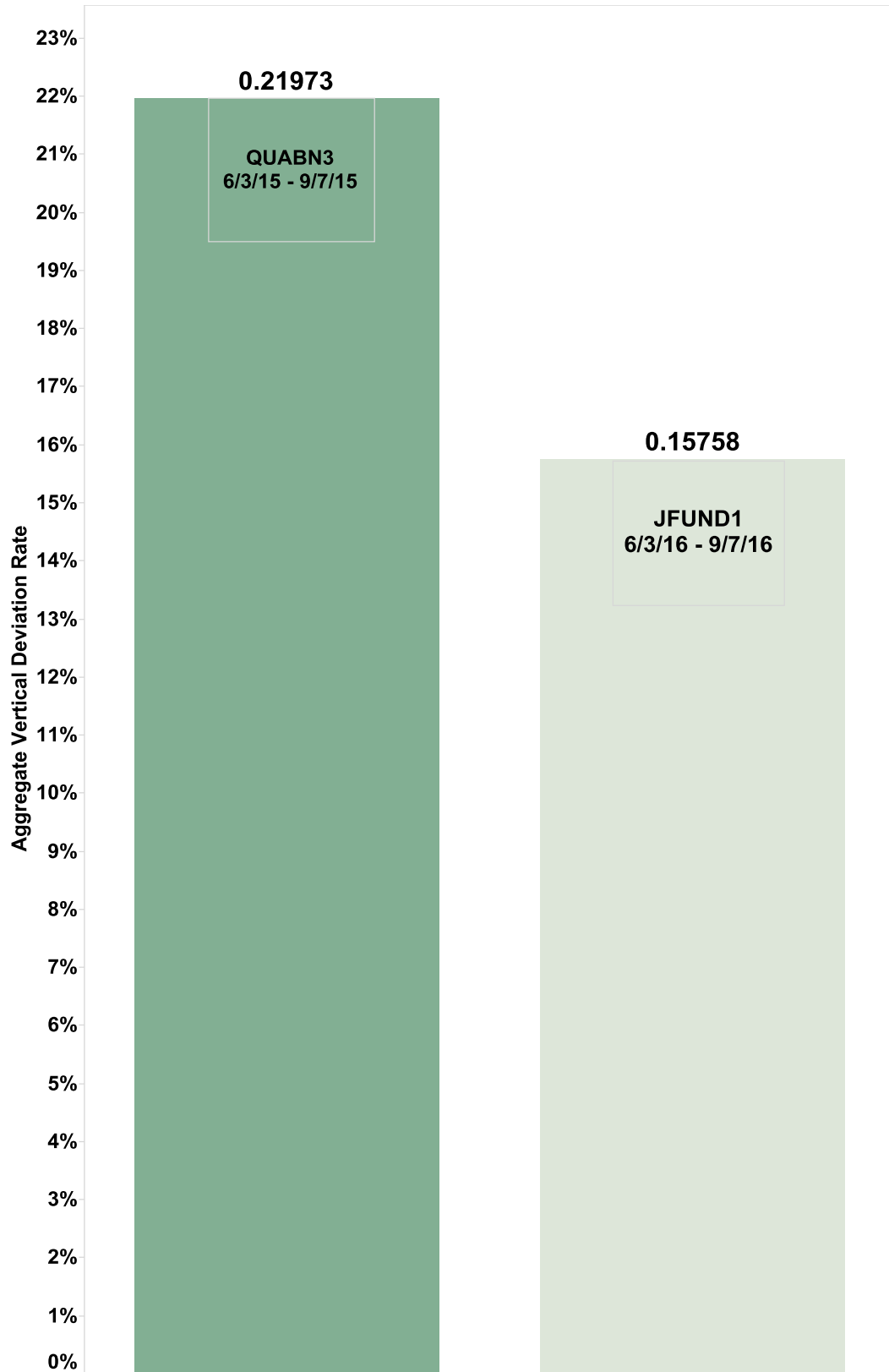
We assume that a flight complying with a 100% of the lateral procedure would be in a position to use the vertical profile as published in the procedure. Furthermore, it is assumed that flying the vertical procedure (if possible) is desirable for fuel savings.

Overall Vertical Compliance Comparison

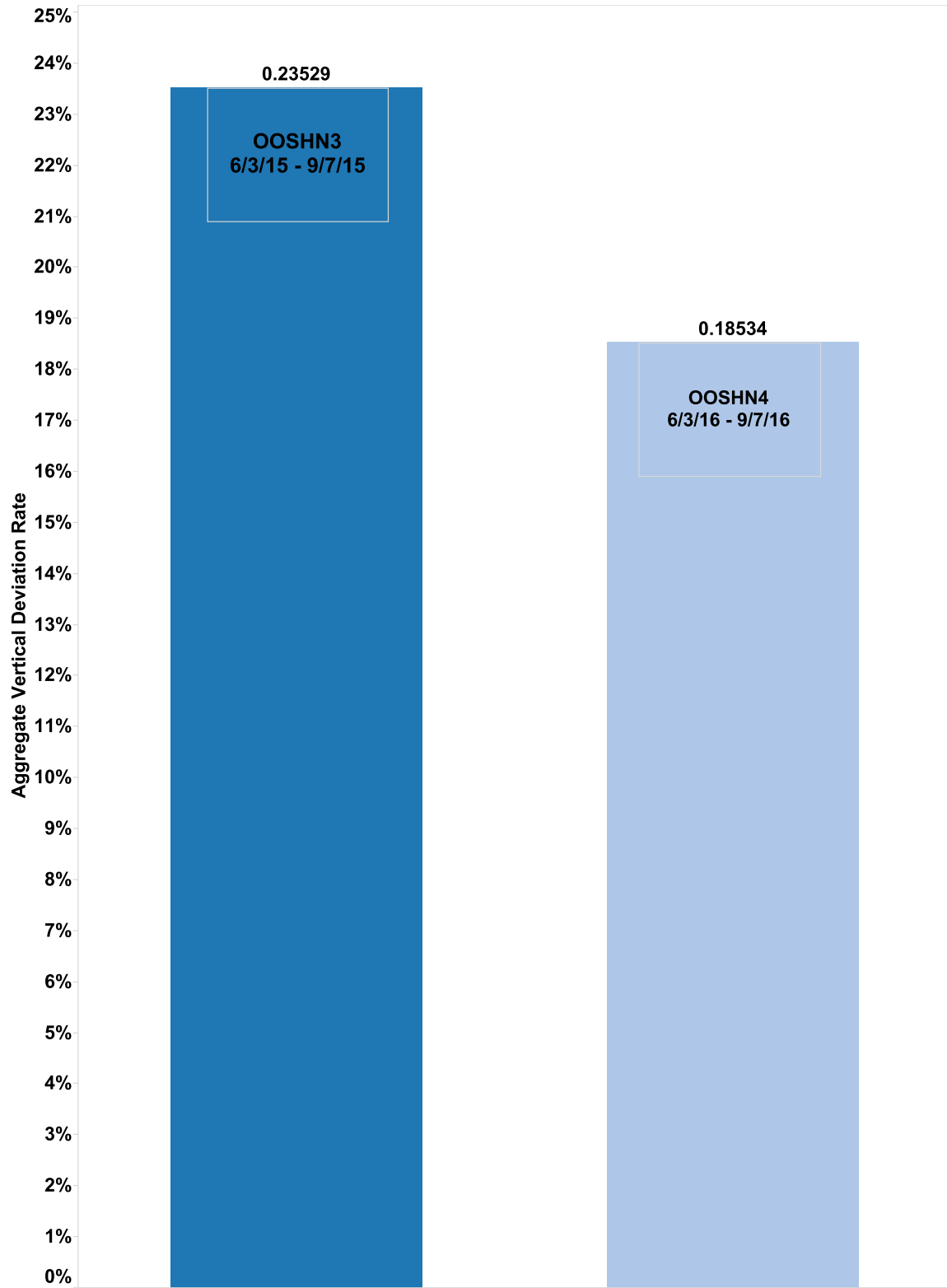
ROBUC1 and ROBUC2 Vertical Deviation Rates for Similar Date Ranges



QUABN3 and JFUND1 Vertical Deviation Rates for Similar Date Ranges

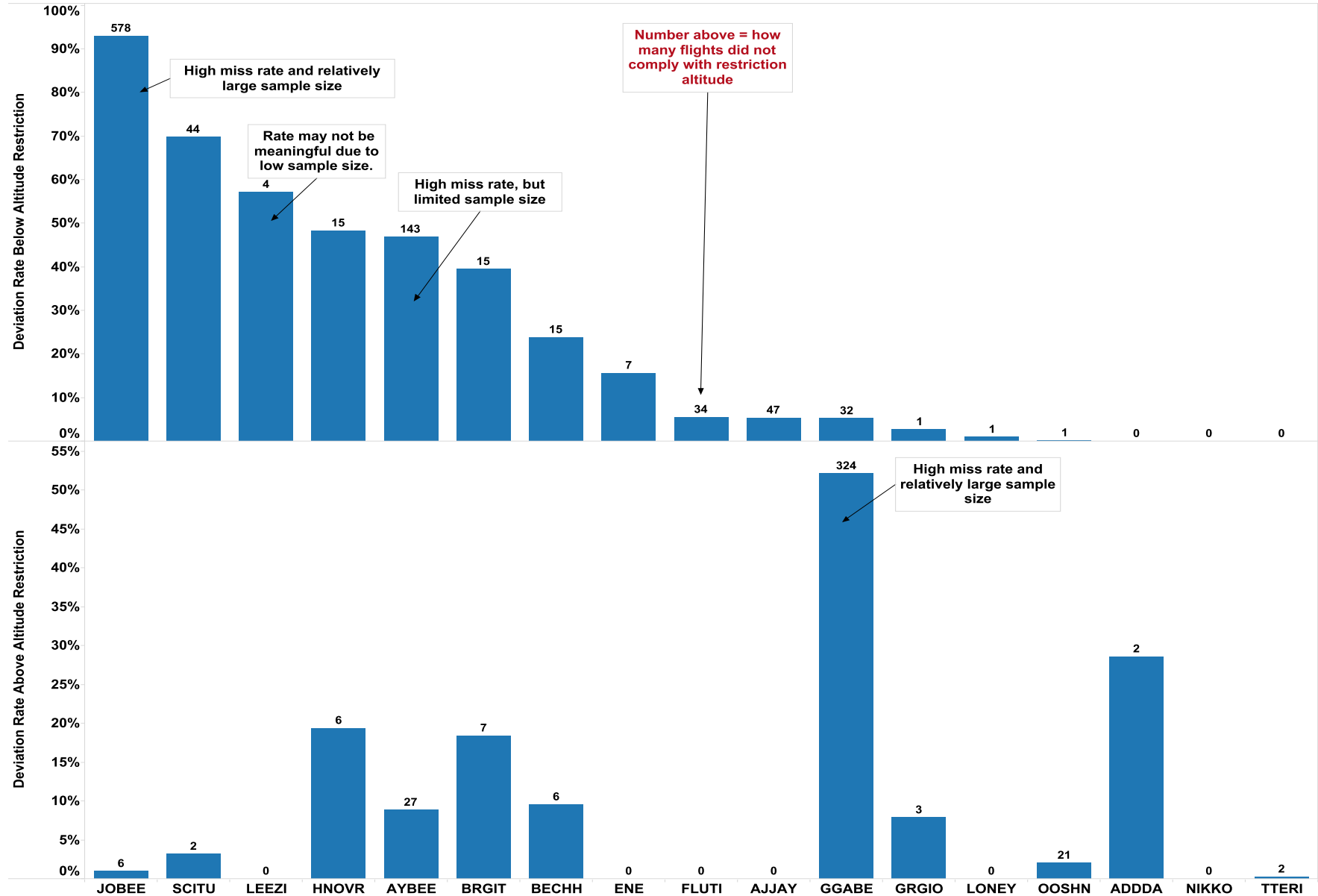


OOSHN3 and OOSHN4 Vertical Deviation Rates for Similar Date Ranges



Waypoint Comparisons Between Arrival Iterations

OOSHN3 Waypoint Altitude Restrictions and Miss Rates Above and Below in Percents



OOSHN4 Waypoint Altitude Restrictions and Miss Rates Above and Below in Percents

